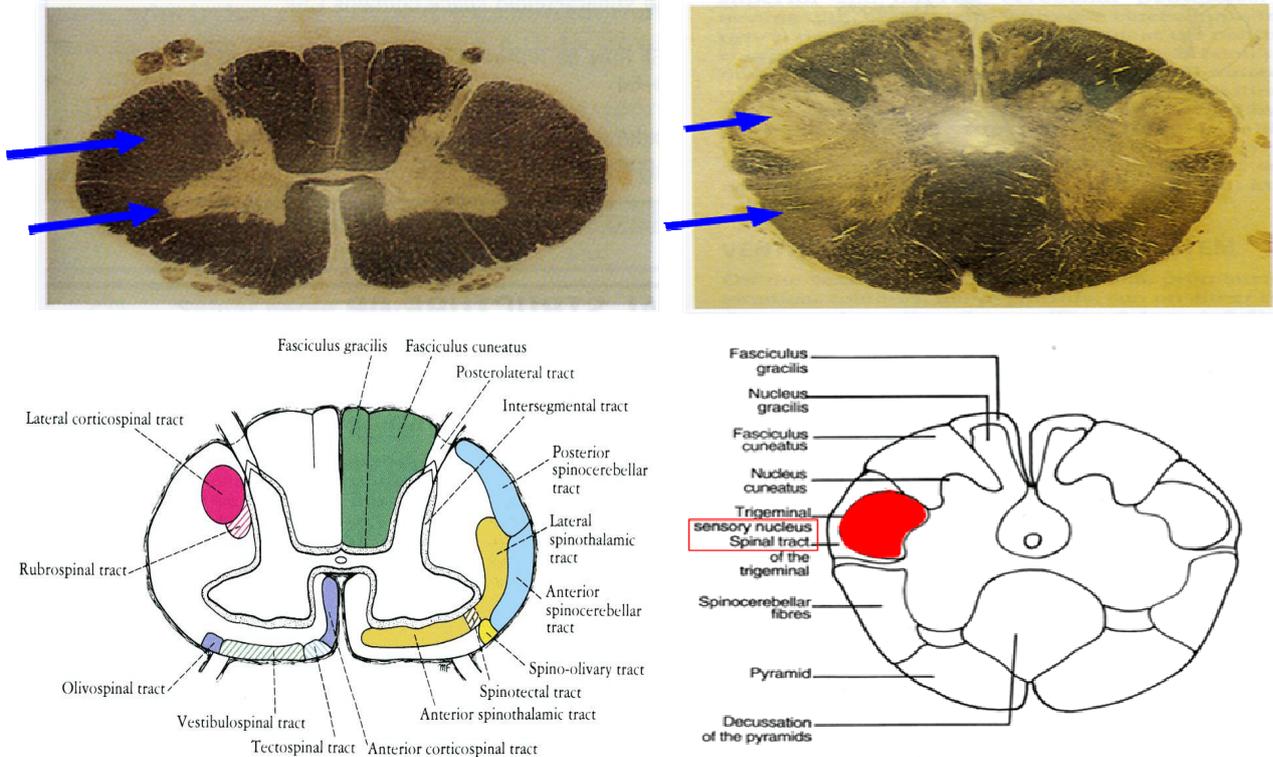


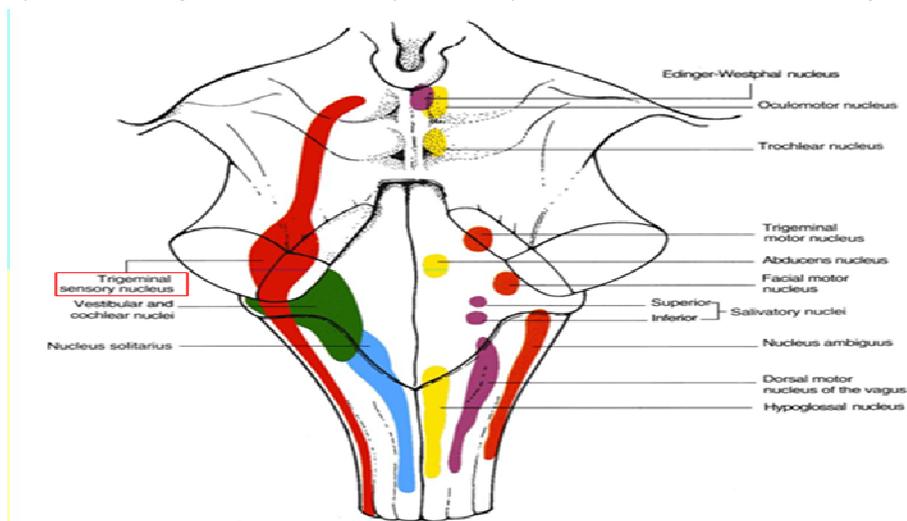
CAUDAL MEDULLA

- At the transition from spinal cord to medulla, the pattern of grey and white matter undergoes considerable rearrangement.
- The **ventral horn** becomes much attenuated.
- The **dorsal horn** is replaced by the caudal part of the **trigeminal sensory nucleus (nucleus of the spinal tract of the trigeminal nerve)**.



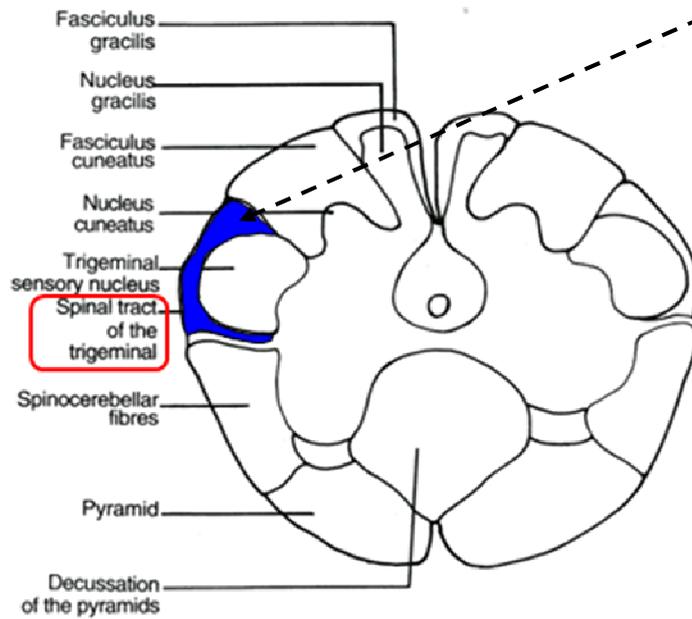
TRIGEMINAL SENSORY NUCLEUS :

- The trigeminal sensory nucleus is regarded as the brain stem homologue of the dorsal horn since it receives primary afferent fibres conveying general sensation from the head, which enter the brain stem in the trigeminal nerve.
- It is a large nucleus that extends the whole length of the brain stem and into the upper segments of the spinal cord.
- This latter, caudal part of the trigeminal nucleus is particularly associated with modalities of **pain & temperature**.



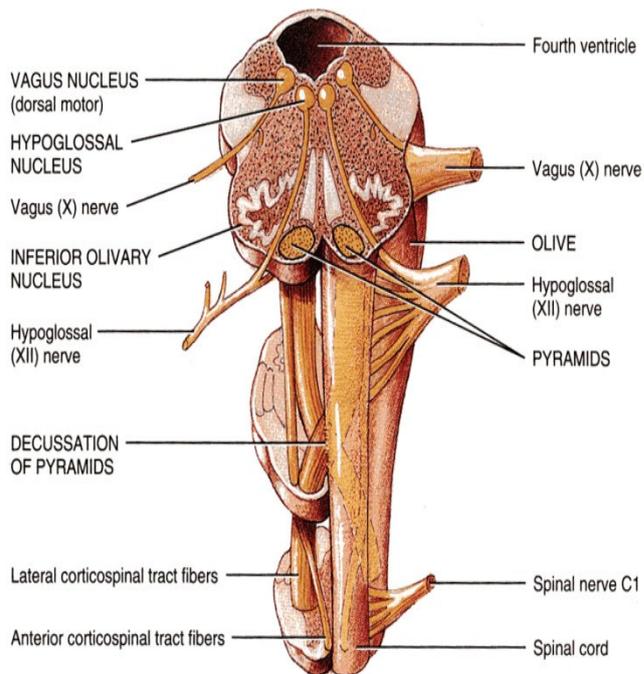
SPINAL TRACT OF THE TRIGEMINAL :

- The **trigeminal nerve** attaches to the pons.
- Fibres that terminate in the parts of the trigeminal nucleus caudal to this level descend in a tract (**the spinal tract of the trigeminal**) which lies immediately superficial to the nucleus.

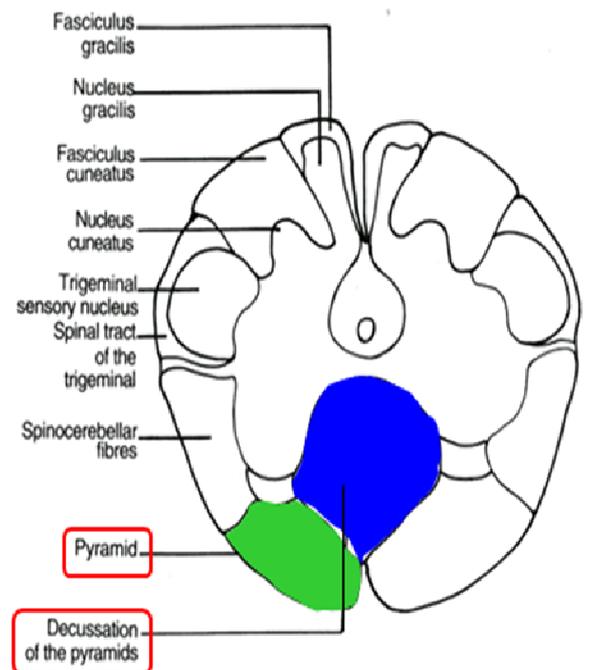


DECUSSATION OF PYRAMIDS :

- In the ventral medulla, the majority of fibres of the pyramid undergo **decussation** then pass laterally, dorsally and caudally to form the **lateral corticospinal tract**.



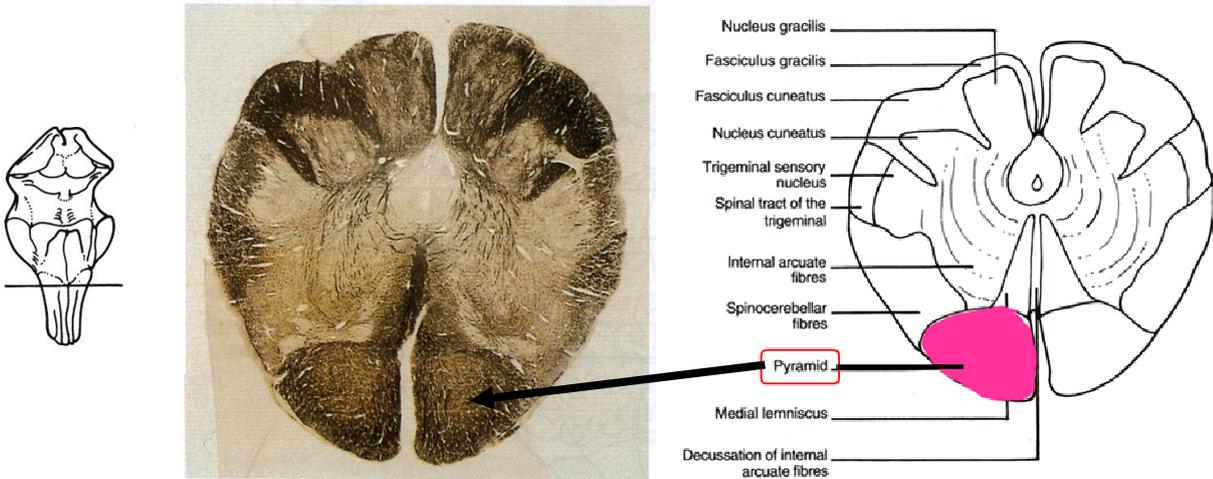
Transverse section and anterior surface of medulla oblongata



MID MEDULLA

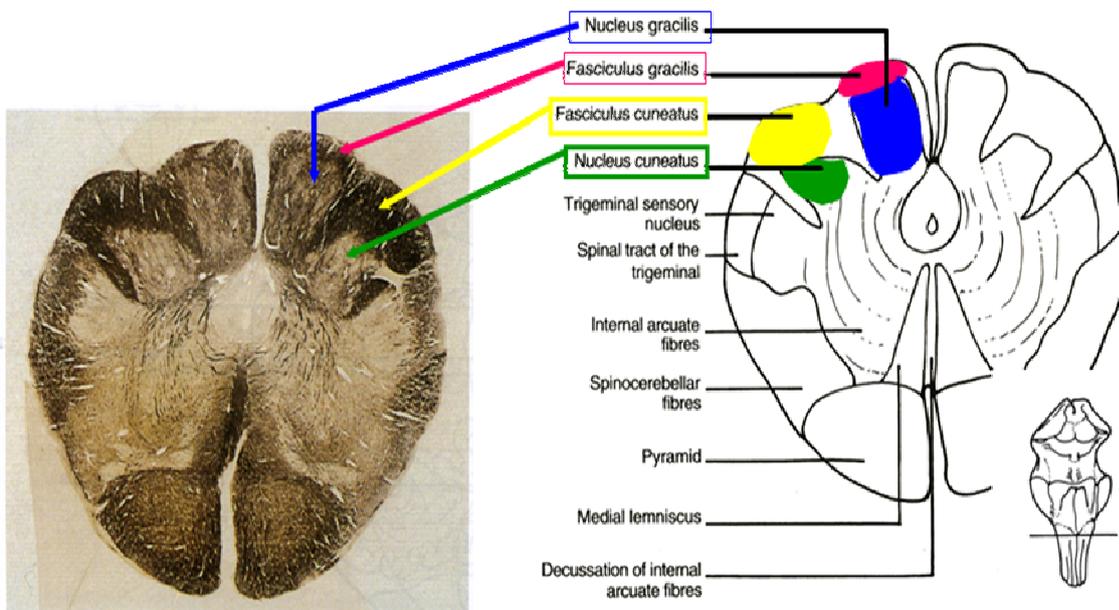
VENTRAL SURFACE :

- On the ventral surface of the mid medulla the **pyramids** are prominent, above their decussation.



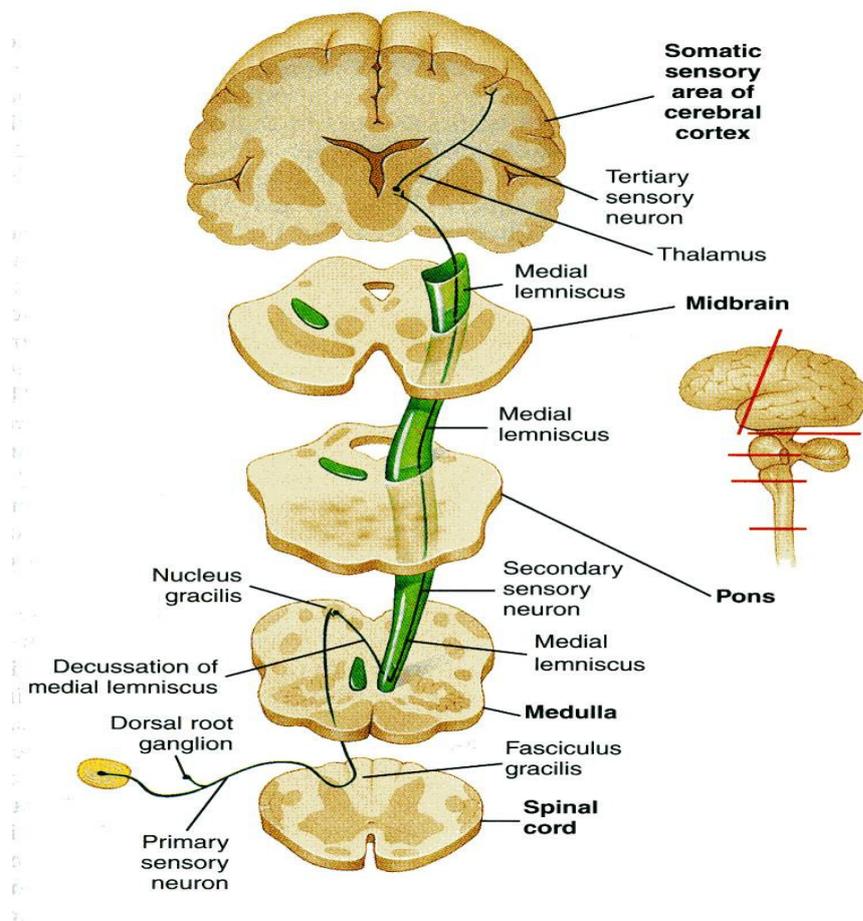
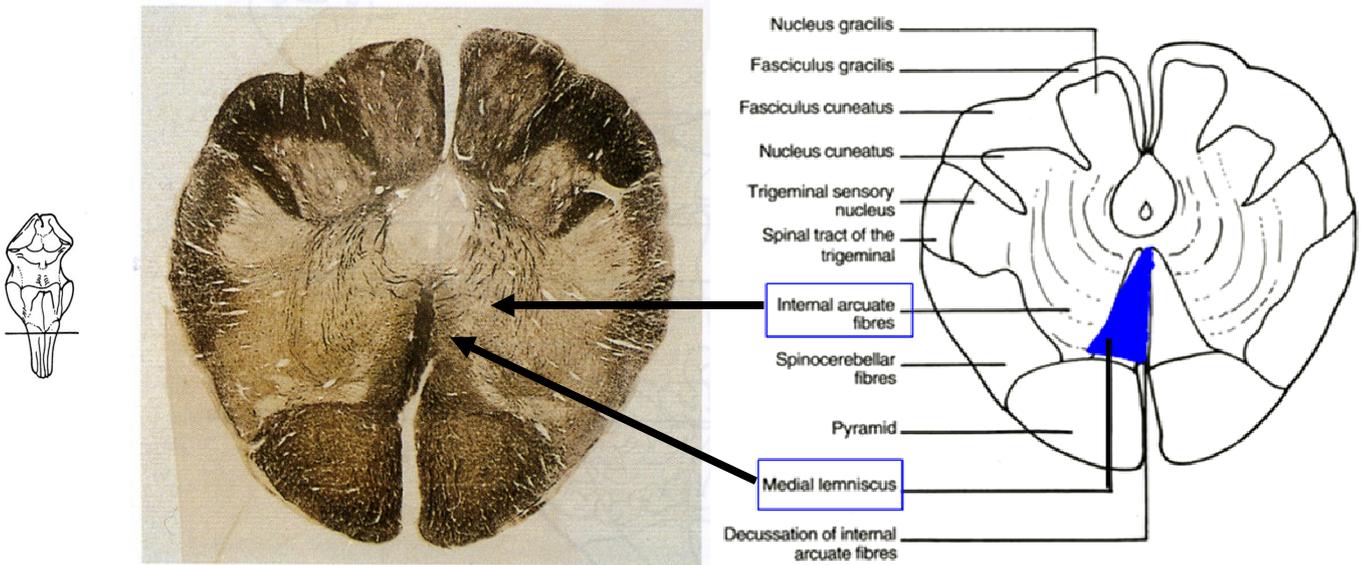
DORSAL SURFACE :

- On the dorsal surface, the **dorsal columns** reach their termination in the **gracile** and **cuneate nuclei** which appear beneath their respective tracts.
- The dorsal columns consist of **first-order sensory neurones** ; the cell bodies of these neurones lie in the dorsal root ganglia of spinal nerves and have central processes that ascended ipsilaterally through the cord and into the medulla.
- They terminate in the **nucleus gracilis** and cuneatus upon the cell bodies of second-order neurones.



MEDIAL LEMNISCUS :

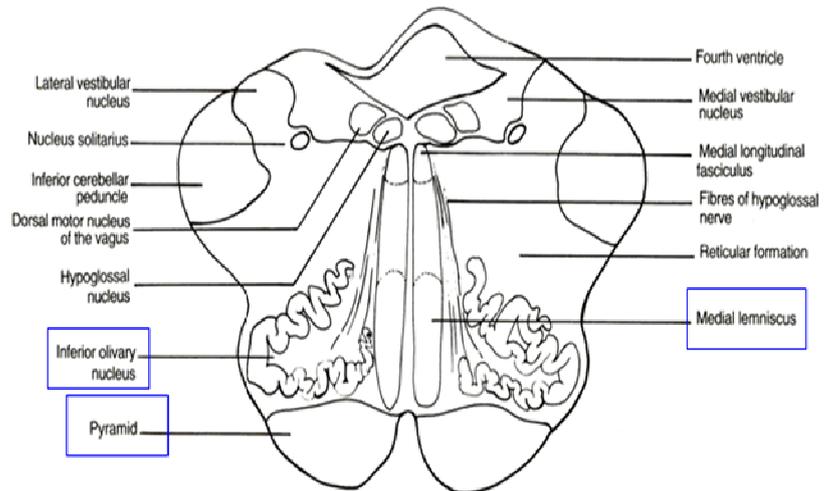
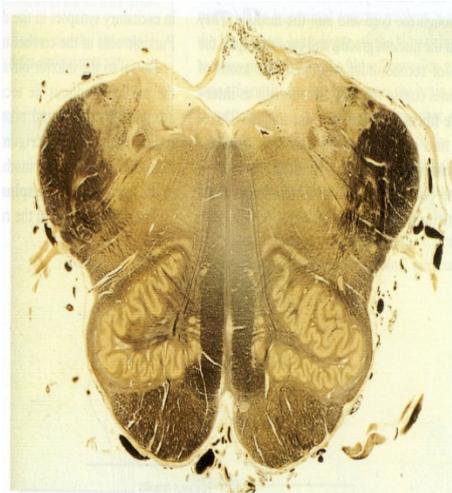
- The axons of these neurones course ventrally and medially as **internal arcuate fibres**, decussating in midline.
- Thereafter, they turn rostrally forming a distinct tract, the **medial lemniscus**, that runs through the rostral medulla, the pons and midbrain to terminate in the ventral posterior nucleus of the thalamus.



ROSTRAL MEDULLA

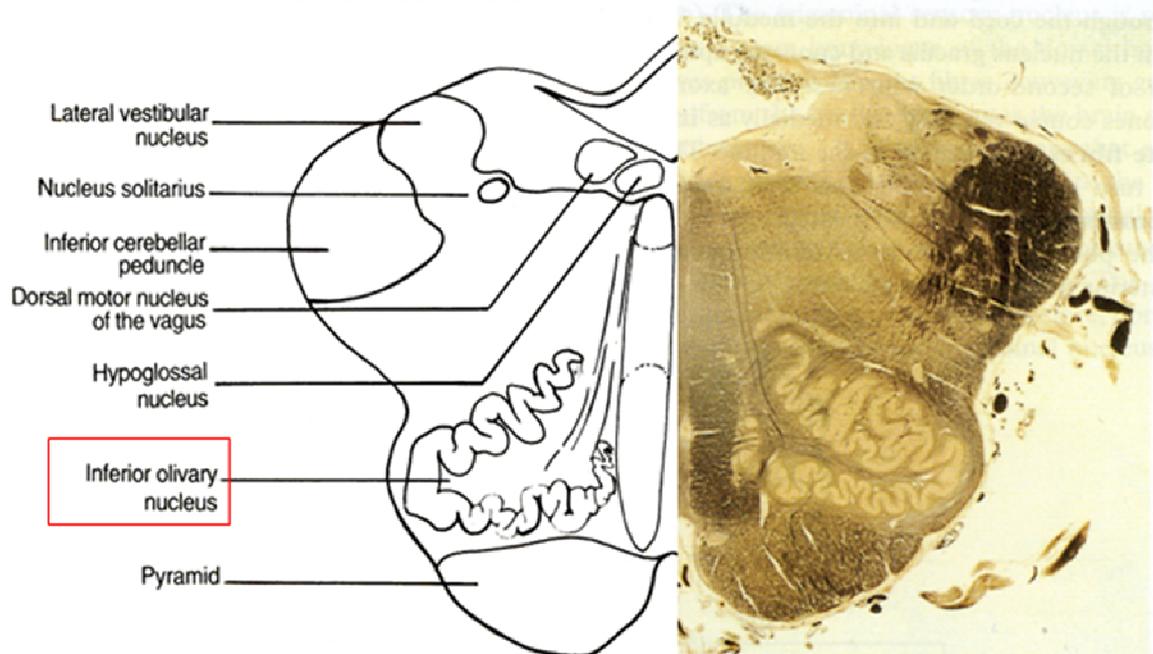
VENTRAL SURFACE :

- On the ventral surface of the medulla, the **pyramids** remain conspicuous.
- Immediately dorsal to the medial aspect of the pyramid lies the **medial lemniscus**, on either side of midline.
- Dorsolateral to the pyramid and lateral to the medial lemniscus is the **inferior olivary nucleus**, lying within the prominence of the olive.

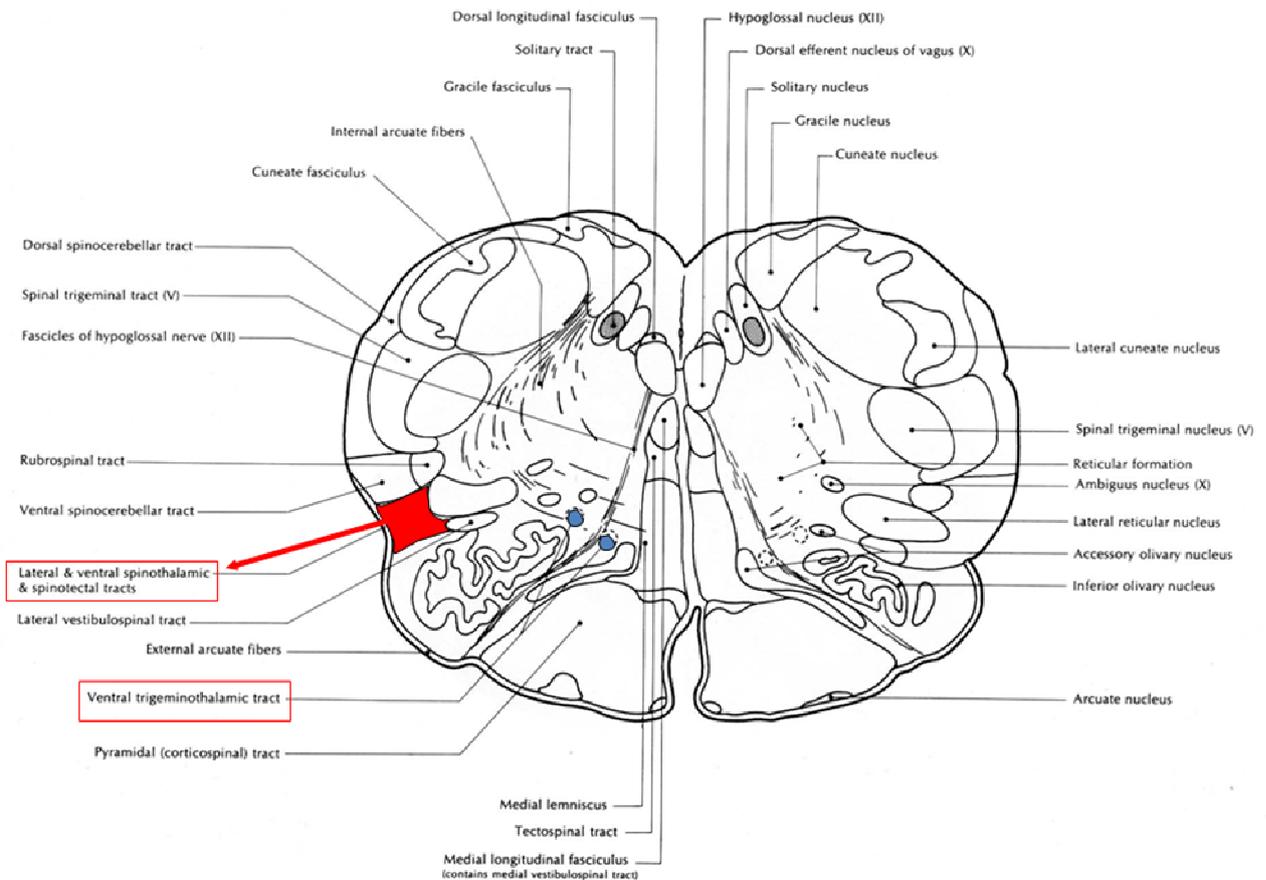


INFERIOR OLIVARY NUCLEUS :

- The **inferior olivary nucleus** has the appearance of a crenated bag with an opening, or hilum, facing medially and through which afferent and efferent fibres pass.
- It is concerned with the control of movement and receives afferents from the motor and sensory cortices of the cerebral hemisphere and from the red nucleus of the midbrain.
- Its main efferent connection is to the cerebellum via the inferior cerebellar peduncle.
- Within the cerebellum its axons, known as **climbing fibres**, end in excitatory synapses in the dentate nucleus and upon Purkinje cells of the cerebellar cortex.

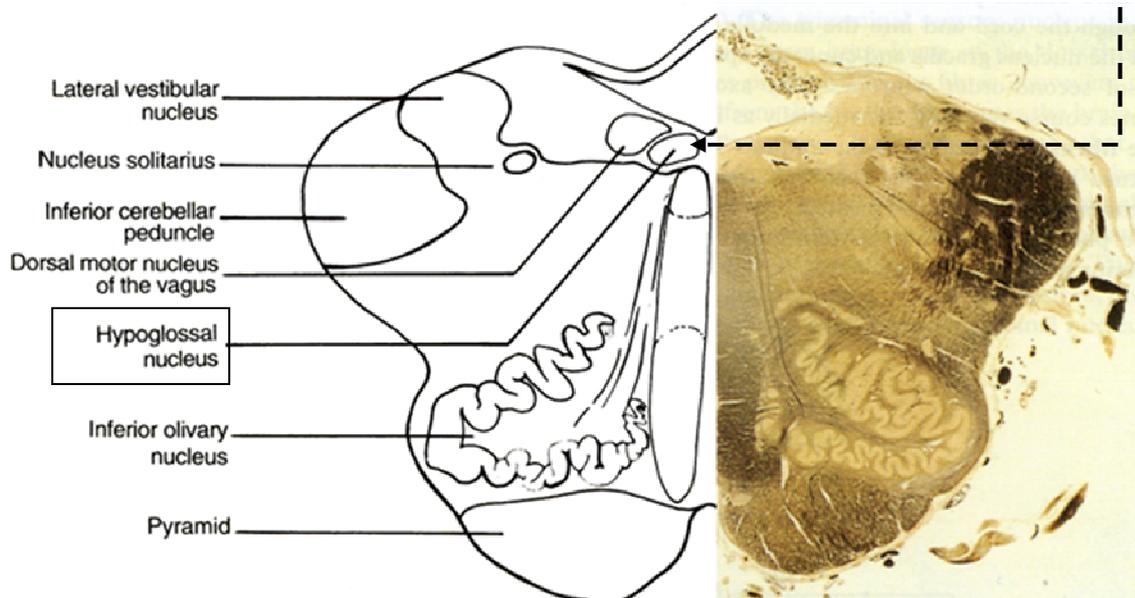


- Dorsal to the inferior olivary nucleus and lateral to the medial lemniscus lie second-order sensory fibres ascending to the ventral posterior thalamus, come from the trigeminal nucleus (the **trigeminothalamic tract**) and from the spinal cord (**spinothalamic fibres**, referred to in the brain stem as the **spinal lemniscus**).



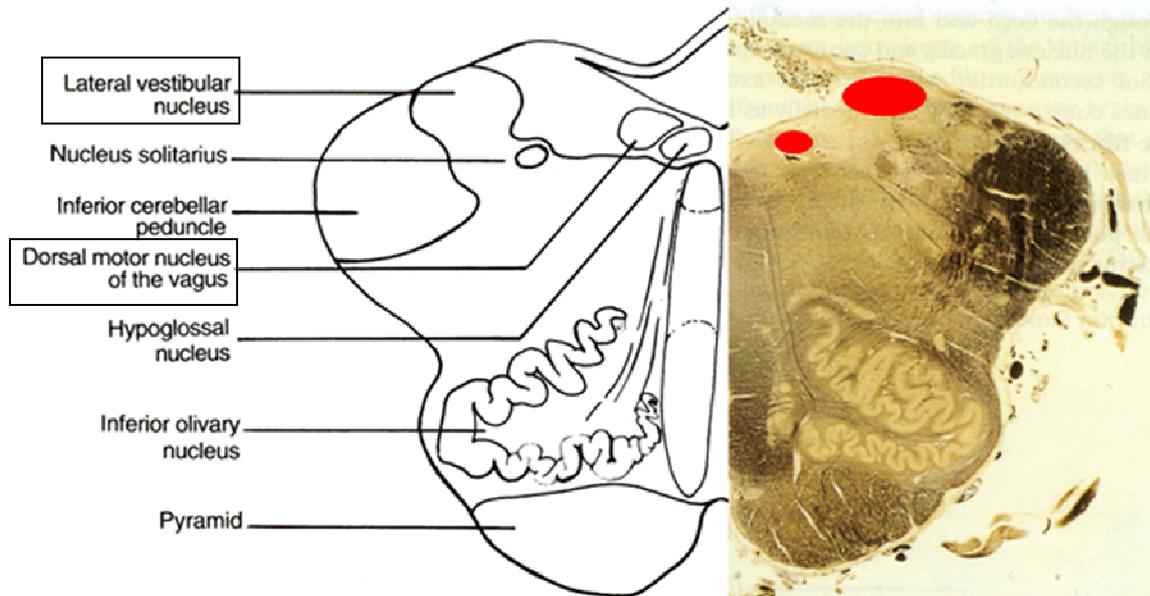
HYPOGLOSSAL NUCLEUS :

- The dorsal surface of the rostral medulla forms part of the floor of the fourth ventricle.
- Both immediately and deep beneath the floor of the ventricle lie a number of **cranial nerve nuclei**.
- Immediately beneath the ventricular floor, just lateral to the midline, lies the **hypoglossal nucleus**, which contains motor neurones innervating the muscles of the tongue via the hypoglossal nerve.



VAGAL & VESTIBULAR NUCLEUS :

- Lateral to the hypoglossal nucleus lies the **dorsal (motor) nucleus of the vagus**, containing preganglionic parasympathetic neurones that run in the vagus nerve.
- The most caudal aspect of the ventricular floor is known as the **area postrema**.
- At this point the blood-brain barrier is absent that limits the passage of certain chemicals from the blood to the brain. This region is the central site of action of substances that cause vomiting (emetics).
- In the lateral part of the floor of the fourth ventricle are located the **vestibular nuclei**, which receive primary afferent fibres from the vestibular nerve.



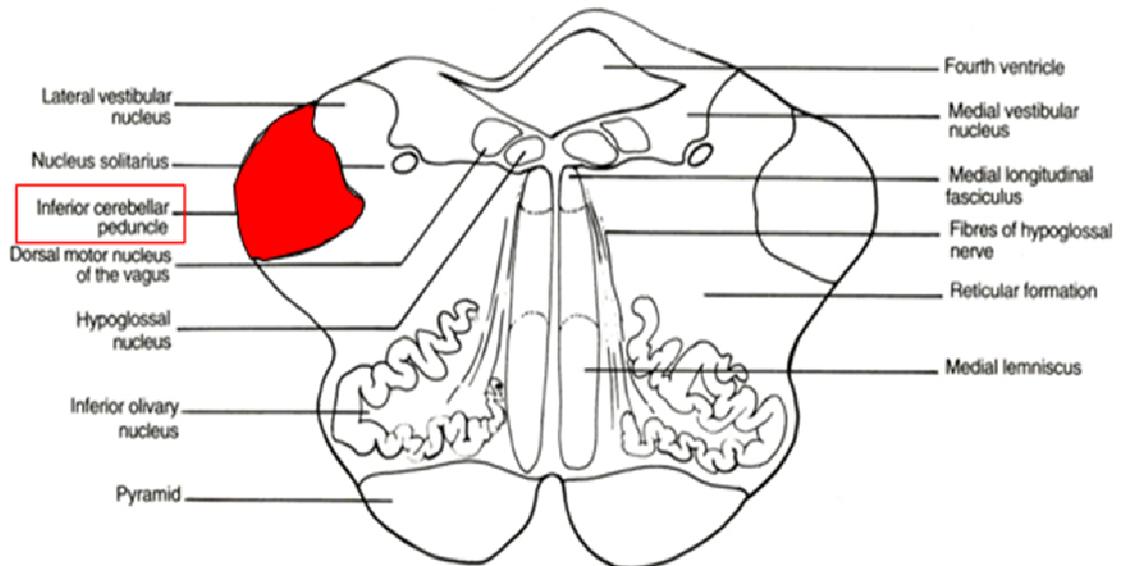
MEDIAL LONGITUDINAL FASCICULUS :

- Ventromedial to the hypoglossal nucleus, close to the midline, is located the **medial longitudinal fasciculus**.
- This consists of both ascending and descending fibres and can be identified also in the pons and mid-brain.
- Within the brain stem, **it links the vestibular nuclei with the nuclei supplying the extraocular muscles** (abducens, trochlear and oculomotor nuclei) and subserves the **coordination of head and eye movements**.



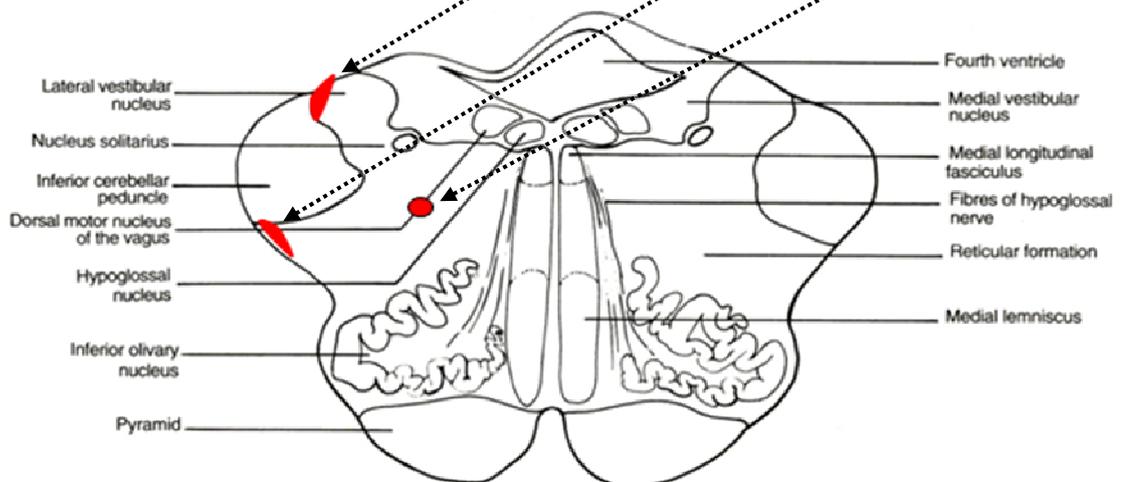
RESTIFORM BODY :

- The dorsolateral part of the rostral medulla is dominated by inferior cerebellar peduncle, or **restiform body**.
- This consists of fibres passing between the medulla and the cerebellum.
- Prominent amongst these are **olivocerebellar fibres**, connections between the vestibular nuclei and the cerebellum, and the fibres of dorsal spinocerebellar tract, conveying proprioceptive information from the limbs.



COCHLEAR AND AMBIGUOUS NUCLEI :

- On the dorsal and lateral aspects of the inferior cerebellar peduncle lie the **dorsal** and **ventral cochlear nuclei**, which receive afferent information from the cochlear nerve.
- Deep beneath the ventricular floor, just dorsal to the inferior olivary nucleus, is located the **nucleus ambiguus**.
- This sends motor fibers into the glossopharyngeal, vagus and accessory nerves and, thence, to the muscles of the pharynx and larynx.



SELF QUIZ

1- All the following structure are present in the caudal medulla EXCEPT :

- a. Trigeminal nucleus.
- b. Decussation of pyramid.
- c. Spinocerebellar fiber.
- d. Inferior olivary nucleus.
- e. Non of the above.

2- Regarding the rostral medulla, which of the following sentences is not true :

- a. The dorsal sensory nucleus of the vagus lie laterally to the hypoglossal nucleus.
- b. The restiform body consist of fiber passing between medulla and cerebellum.
- c. Medial lemniscus lie dorsomedial to the pyramid.
- d. The rostral part only of the medulla contribute in the formation of the fourth ventricle.
- e. Non of the above.

3- Regarding the mid medulla, which of the following sentences is true :

- a. The dorsal columns end in the medial lemniscus.
- b. The internal arcuate fibers carry firs order neuron.
- c. On the ventral surface of the mid medulla the pyramid are prominent below the their decussation.
- d. The medial lemniscus terminate in the ventral posterior nucleus of the thalamus.
- e. Non of the above.

1. d	2. a	3. d
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THE END

LoveTomy Team 426

Team leader : Dr. hams

همي بروحي

Cute Killer